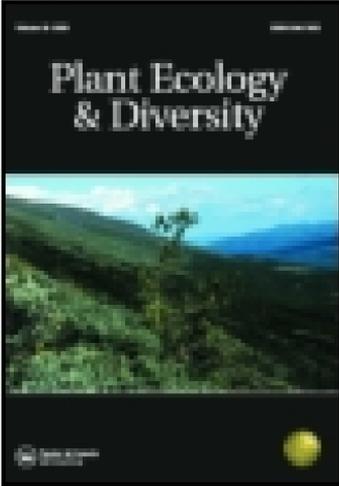


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## Presidential Address.—The European Species of the Genus *Primula*

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TRANSACTIONS AND PROCEEDINGS  
OF THE  
BOTANICAL SOCIETY OF EDINBURGH.

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SESSION LXVI.

PRESIDENTIAL ADDRESS.—THE EUROPEAN SPECIES OF THE  
GENUS PRIMULA. By Rev. DAVID PAUL, LL.D.,  
Edinburgh.

(Delivered 14th November 1901.)

There is no group of plants that surpass in elegance and beauty those of the order of Primulaceæ, comprising the genera *Primula*, *Soldanella*, *Androsace*, *Anagallis*, and others. The species are not only beautiful without exception, but they possess a neatness and modesty and grace which specially endear them to all lovers of nature. They are peculiarly interesting also to the cultivator of plants, as they respond well to care and attention, while they require just enough horticultural knowledge and skill to render the successful cultivation of them an attractive pursuit. I propose, therefore, to make some observations on the genus *Primula*, the most important genus in the order.

The species of *Primulæ* are found in all the temperate regions of the northern hemisphere. They are very poorly represented, however, in America. On the Atlantic side of the continent *P. farinosa*, L., alone occurs, extending southwards hardly beyond the border of Canada. Six species occur on the Pacific side, in the Rocky Mountains, viz.

*P. farinosa*, L.; *P. Rusbyi*, Greene; *P. angustifolia*, Torr.; *P. Cusickiana*, A. Gray; *P. suffrutescens*, A. Gray; *P. Parryi*, A. Gray. In the old world there is a great variety of species. Europe possesses in all thirty-one, scattered over the British Isles, Scandinavia, Finland, Russia, the Pyrenees, Alps, Austria, Italy, Bulgaria, and Thrace. But by far the greater number of species is to be found in Asia, especially in the Eastern Himalayas, but also in Afghanistan, Thibet, China, Japan, and elsewhere. The well-known *P. sinensis*, Lindl., and *obconica*, Hance, are natives of China; *P. Sieboldi*, Morren, and *P. Japonica*, Gray, are from Japan; *P. floribunda*, Wall., from Afghanistan; *P. verticillata*, Forsk., from Arabia and Abyssinia; *P. luteola*, Rupr., from the Eastern Caucasus; *P. rosea*, Royle, from the Western Himalayas; *P. capitata* and *P. Sikkimensis*, Hook., from Sikkim; *P. denticulata*, Sm., and *P. involucrata*, Wall., from Cashmere. I mention these as being all well-known, cultivated plants in this country. A large number seem not yet to be grown by our horticulturists.

Turning, however, to the Primulæ of Europe, I proceed to enumerate them (omitting for the present the hybrids), describing the greater number, and making any remarks on the different species that may seem to be called for.

They may be grouped under three sections, or subgenera, of which *P. auricula*, L., *P. farinosa*, L., and *P. officinalis*, L., may be taken as the respective types.

I. The first section, that of **Auricula**, is marked by the leaves being involute in the young state, by the flowers being almost always umbellate, and by the short, globose or oval capsule. The only other group of Primulæ with involute leaves is a small foreign group consisting of *P. floribunda*, Wall.; *P. verticillata*, Forsk.; and *P. Aucheri*, Jaub. and Spach.

The twenty-two species of this section are exclusively European. No species occur either in America or in Asia. Moreover, in Europe they are confined to the southern mountain ranges, and they are most of all to be found in the Eastern Alps. Three only—*P. integrifolia*, L., *P. viscosa*, All., and *P. hirsuta*, All.—occur in the Pyrenees;

one—*P. Palinuri*, Pet.—is found in the neighbourhood of Naples; while three—*P. minima*, L., *P. clusiana*, Tsch., and *P. auricula*, L.—travel as far east as the Carpathians. Their chief home is the Tyrol and Carinthia. They do not occur in the north of Europe.

A. The section *Auricula* has been divided by Schott into different groups of species. The first of these is that of *Auricula* proper, or EUAURICULA, with yellow, or violet, heterostyle flowers; a short calyx; a corolla marked with a zone of farina near its base; short, broad, involucrel bracts; farinose leaves bearing glandular hairs; and a short, globose or oval capsule.

1. *P. AURICULA*, L.—Very widely distributed over the Swiss and Austrian Alps; also in the Pyrenees, Jura, Apennines, Carpathians. Leaves quite entire, or repand-denticulate; leaves, calyx, and flowers white-farinose; flowers yellow, fragrant. There is a well-marked variety (*albocincta*) with comparatively little farina on the surface of the leaves, which, however, have a conspicuous, white, farinaceous border. This seemed to be the prevailing form in the neighbourhood of Val Daone. Another variety (*nuda*), which occurs in the Dolomite district, has farina only on the calyx. Still another variety (*monacensis*), found sparingly on the Alps, but in greater quantity in the neighbourhood of Munich, is distinguished by its very broad leaf-stalk and its narrow spread of leaf.

*P. BALBISII*, Lehm., is a sub-species of *P. auricula*, L., in which the green parts of the plant are destitute of farina, and the gland-bearing hairs are longer, being dense on the margins of the leaves, but occurring more sparingly on their surface. The colour of the flowers is a darker yellow, not so bright as in *P. auricula*, and they are without scent. This is *P. ciliata*, of Moretti.

2. *P. PALINURI*, Pet., is the only other yellow *Auricula*. It occurs in the neighbourhood of Cape Palinurus, in Italy. Apart from its being, in general, a larger plant, its main difference from *P. auricula* lies in the fact that, instead of the cartilaginous leaf-border and short sepals of the latter, the leaves are only cartilaginous at the points of the teeth, and the sepals are large and leaf-like.

3. *P. MARGINATA*, Curt.—This *Primula* occurs only in Dauphiny and the south of Piedmont, and in the Maritime and Cottian Alps. Not found in Switzerland. Leaves bluntly dentate, with a remarkable margin of white farina. calyx farinose. Flowers lilac-blue, passing sometimes almost into rose; throat of corolla generally of same colour.

4. *P. CARNIOLICA*, Jacquin.—Found apparently only in the mountains about Idria, in Carniola. Leaves nearly entire, without farinaceous border; calyx and corolla without farina. Flowers rose or lilac; throat of same colour.

*B.* Passing from the group *Euauricula*, and continuing to adopt the division of Schott, I take up next those *Primulæ* which he groups under the term *ARTHITICA*, of which the characteristic marks are that the leaves are quite entire, surrounded by a distinct cartilaginous border; the involueral bracts elongated and narrow; the flowers shortly pedunculate, or sessile, and of a rosy violet colour; the segments of the bifid, obovate corolla hairy but without farina at the throat; and the calyx long. Outer covering of the seeds plane.

In this group there are six species.

5. *P. CALYCINA*, Duby, = *P. GLAUDESCENS*, Moretti.—This plant occurs in the north of Lombardy, from the Lake of Como to district of Judicaria. The leaves are not punctate, and quite glabrous on the upper surface; the cartilaginous margin is very broad and somewhat eroded; they are lanceolate or elliptic-lanceolate; glaucescent; with an acute apex. Involueral bracts, linear, acute, long. Flowers rosy, purple, or lilac.

There is a variety, *longobarda*, Porta, which is smaller with a shorter, blunt-toothed calyx, and smaller flowers. Pax regards this as an intermediate form between *P. spectabilis*, Tratt., and *P. calycina*. Widmer holds it to be simply a form of *calycina*.

6. *P. CLUSIANA*, Tausch. — Found, on limestone, in Eastern Bavaria, Salzburg, Upper and Lower Austria, and north of Styria. Leaves not punctate, with a narrow cartilaginous border; bright green; oval or oblong-oval

apex rounded, obtuse, or acute. Involucral bracts generally longer than the peduncles. Calyx teeth oval, blunt, somewhat distant from the corolla-tube. Capsule half the length of the calyx. Flowers rosy.

*P. admontensis*, a plant found by Gusmus sparingly at Admont, in Styria, among *P. clusiana*, differs from the latter only in the leaves being toothed from the middle upwards—the teeth small, distant, blunt, fourteen or sixteen on a leaf. Widmer regards this plant as arising from the repeated crossing of some *clusiana* hybrid with *P. lusiana*, and thinks that *clusiana* hybrid may be either *P. auricula* × *clusiana*, *P. clusiana* × *villosa*, or *P. clusiana* × *minima*. *P. Churchillii* seems to be much the same plant.

7. *P. WULFENIANA*, Schott.—Occurs on limestone, on the Alps of Venetia, Carinthia, and Carniola. Leaves very stiff, dark blue-green, not punctate, with broad, whitish, cartilaginous margin, glaucescent, elliptic or oblong, with acute apex, glabrous; their margin, as also the calyx, beset with minute glandular hairs. Involucral bracts generally longer than the peduncles; teeth of the long calyx obtuse, and adpressed to tube of corolla; capsule shorter than calyx; flowers rosy lilac.

8. *P. SPECTABILIS*, Tratt.—On limestone, Alps of Bergamo and of the Southern Tyrol. Leaves *pellucid-punctate*, with broad cartilaginous border, viscid. Flowers rosy red, passing into violet; throat whitish. Easily identified by the pitted, sticky leaves.

9. *P. INTEGRIFOLIA*, L.—Pyrenees, Switzerland, Tyrol. Not in Dauphiny, Savoy, or Piedmont. Leaves soft, bright-green, shining, *without cartilaginous margin*, very entire, elliptic or oblong, somewhat viscid, sparsely covered with long, glandular, articulate hairs. Calyx teeth obtuse or rounded; involucral bracts rarely reaching the top of the calyx; capsule shorter than the calyx. Flowers dark rosy-lilac; throat of the same colour.

10. *P. KITABELIANA*, Shott.—Found in Croatia, on limestone; Servia; Herzegowina. Leaves somewhat glaucescent, fragrant, *without cartilaginous border*, large, elliptic-oval or oblong-lanceolate, entire, or denticulate on the upper half; green parts of the plant more or less viscid, beset with

short glandular hairs; involucre bracts about reaching base of calyx; capsule half the length of calyx; flowers rosy, with whitish throat which is covered with longish glandular hairs.

These two last *Primulas* do not properly belong to the group *Arthritica*, being destitute of cartilaginous border.

C. The next group comprises six *Primulas*, and is named by Schott ERYTHRODROSUM. Its characters are—leaves fatty, dentate-serrate or serrulate, without cartilaginous border, densely covered with hairs, which exude a red gum, veins immersed. Involucre bracts short, flowers peduncled, red or white, not yellow, calyx longish.

11. *P. HIRSUTA*, All., = *P. VISCOSA*, Vill.—Pyrenees and Alps; very widely distributed. Leaves obovate or rounded-obovate, more or less toothed along the whole margin; capsule shorter than the calyx.

Of this *Primula* there are four varieties—(1) *P. ciliata*, Schrank, in which the teeth of the leaves are equal, and the margin is white and densely glandulose; (2) *P. pallida*, Schott, with unequal teeth, pale lilac blooms and cuneate, obovate flower-tips; (3) *P. confinis*, Schott, with very fleshy, extended leaves, thickly covered with brown glandular hairs, broad corolla-tips, and very short calyx teeth; (4) *P. excapa*, Heg., with sessile leaves, whose teeth are cut in the form of an arch, and with almost stemless flowers, which sit on the rosette of leaves, and are together almost larger than the whole plant. This variety occurs at very high altitudes. There is also a variety with white flowers, which is the so-called *P. nivalis* of gardens.

12. *P. GENENSIS*, Thom.—Found on the Alps of the southern and western Tyrol, and of eastern Switzerland; Ortler, Val Muranza, Val Daone, Val Venosta, etc. This is the smallest of the group, though other species may be found as small, when they grow in poor, dry situations, or at high altitudes. Its small, cuneate, and truncate leaves are found among none of the allied *Primulas*; but to make sure of correct identification, it is well to note the character of the hairs on the very viscid leaf, which are thick and short and bear large reddish yellow or dark red glands, the calyx pressed close to the corolla tube, the short peduncles,

and the capsule a little longer than the calyx. I could find only a few specimens of this plant on the mountains bordering the Val Daone.—Syn. *P. daonensis*, Leybold.

The var. *Judicariæ* is a somewhat larger plant with cuneate leaves, coarsely toothed towards the apex, the middle tooth longer and somewhat larger than the rest.

13. *P. VISCOSA*, All.—There is much confusion in the nomenclature of this *Primula*. Kerner and Pax retain Allioni's name. Widmer adopts the name of Lapeyrouse, *P. LATIFOLIA*, objecting to the name *viscosa* as unsuitable, the plant not being particularly viscid; and he rejects Villar's name of *P. HIRSUTA* to avoid confusion with another species, and as not being specially characteristic. Hegetschweiler calls it *P. GRAVEOLENS*. I retain the name by which the plant is best known.

Found widely distributed from the Pyrenees through the chain of the Alps to the 10th degree of E. Longitude. Not common on the Pyrenees or Western Alps. On granite.

Leaves somewhat flaccid, fragrant, without cartilaginous margin, oval, round-oval, oblong-cuneate or lanceolate-cuneate, gradually narrowed into a generally long petiole, from about the middle to the apex acutely-dentate or repand-denticulate, or quite entire, the surface and margin somewhat densely clothed with short glandulose hairs. Glands small, colourless, not reddening the drying paper. Peduncles generally long. Calyx teeth adpressed to tube of corolla. Flowers secund, nodding, violet or reddish violet, throat and interior of tube of same colour. Corolla infundibuliform. Farina rare on the throat of corolla, and very sparingly on the calyx. Anthers of the short-styled flowers set on the throat or a little below it. Capsule hardly or considerably longer than the calyx.

The scent is peculiar, and stronger than in other *Primulas*. It has been compared to the smell of bitumen, or of *Geranium robertianum*, or of weak musk.

The plants with the leaves quite entire (in form very similar to those of *Cynoglossum vulgare*) are from the Maritime Alps. Their flowers are somewhat brighter in colour.

14. *P. PEDEMONTANA*, Thom.—Occurs in Piedmont and

Savoy; not in Switzerland. Leaves obovate or oblong-lanceolate, narrowed gradually—more rarely suddenly—into the petiole, quite entire, or repand-dentate, more rarely distinctly dentate, surface almost glabrous, margin thickly beset with very short glandular hairs. Glands somewhat large, cinnabar-coloured, or more rarely purple. Calyx teeth somewhat appressed. Capsule same length as calyx. Flowers dark rose, seldom pale rose, rarely white; inner portion of corolla mostly pure white.

To be distinguished from the other *Primulas* that have coloured glands, by the almost shining leaves with red margins and very shortly stipitate glands.

15. *P. APENNINA*, Widm. In the northern Apennines: Mte. Orsajo.—Leaves oblong or oval, entire, or dentate towards the apex; teeth small, approximate, the surface and margin beset with short glandular hairs; glands somewhat large, purple. Scape a little longer than, or twice as long as, the leaves. Peduncles very short, calyx teeth sub-adpressed to the corolla tube. Capsule one-fifth or one-sixth shorter than the calyx.

This description by Widmer is taken from specimens in fruit; he does not give the colour of the flowers.

His remarks are: *P. apennina* has the habit of a *P. pedemontana* grown on poor soil, from which it differs in the more copious covering of hair on the leaf surface, but sparser border of hair on the margin (the margin is not red), and further in the calyx being longer in proportion to the capsule. From *P. aenensis*, *P. villosa*, and *P. cottia*, it is distinguished by the covering of hair being not so thick, and shorter, and by the longer capsule. From *P. hirsuta*, All., with which it agrees in the calyx, it is separated by the much shorter and less thickly-set hairs, by the longer flower stalk, the shorter peduncles, and also by its habit.

16. *P. COTTIA*, Widm.—In Piedmont, Cottian Alps, at an altitude of 3000–6500 feet: Val Germanasco, Valleys of Clusone and Von Oulx.

This *Primula* is very similar to *P. villosa*, especially to the form from Rennfeld, but differs in the shorter capsule, in the proportionately longer calyx, and somewhat thinner leaves. It is marked off from the sub. sp. *commutata* by

the longer and closer-set hairs, as also by the somewhat broader leaves, which have shorter petioles, and are less bluntly toothed, while the comparative length of capsule and calyx is nearly the same.

Widmer remarks that he does not venture to join it as a variety to *P. villosa* and *P. commutata*, to which it approaches nearest in habit and other characters, because the localities in which it is found are separated from the home of the latter by a wide tract of country yielding distinct species (*P. hirsuta*, All., and *P. cœnensis*). He is of opinion that it is more intimately connected with *P. hirsuta*, All., from which it differs in its longer flower stalk, in the leaves more gradually narrowed into the petiole, in its longer hairs which have less highly coloured glands, in its shorter peduncles, in its calyx teeth closer to the tube of the corolla, and in its capsule being longer as compared with the calyx.

The colour of the flowers of *P. villosa*, *P. commutata*, *P. cottia*, and *P. hirsuta*, All., is very much the same.

17. *P. VILLOSA*, Jacquin.—On the Alps of Styria, Carinthia, and Carniola—on granite. Leaves obovate or oblong, gradually narrowed into the shortish petiole, more rarely almost suddenly contracted, apex obtuse or rounded, more rarely sub-truncate, toothed from the middle or only near the apex, with small close teeth, sometimes quite entire, the surface and margin somewhat densely covered with longish glandular hairs; glands small, red; peduncles short; capsule generally a little longer than the calyx; flowers lilac or rose; inner part of corolla mostly pure white.

Closely allied to *P. cœnensis*.—The variety *norica* of Kerner is the smaller leaved form, with the hairs shorter, and not so thickly distributed. The leaves are generally narrow and truncate.

Sub-sp. *P. COMMUTATA*, Schott, is distinguished by thinner leaves, the blade and stalk of which are longer, by larger, more distant teeth, a somewhat longer calyx, and somewhat shorter capsule. These points are not constant enough to mark a distinct species.

*D.* The next two species form a group to which Schott gives the name *RHOPSIDIUM*. The leaves are fleshy, with

cartilaginous teeth, and are surrounded by a very narrow, indistinct, cartilaginous border, and densely clothed with hairs, which exude colourless viscid matter. Involucral bracts narrow, elongated. Flowers subsessile, more or less violet; calyx of moderate length; corolla lobes bifid, and glandular-hairy; the throat with glandular hairs and coloured folds reaching to the partition of the lobes.

18. *P. ALLIONII*, Loisl.—Scattered over a small region between Cuneo and Nice, in the Maritime Alps—on limestone.

Leaves somewhat fleshy, very viscid, grey-green, almost scentless, roundish or oblong, entire or toothed. Green parts of the plant without farina, very densely covered with glandular hairs; glands colourless; flower stem scarcely one mm. long; peduncles two to four mm. long; calyx teeth adpressed. Flowers rosy, throat white and beset with short glandular hairs; anthers of the short-styled flowers distant from the throat by one-fifth of the length of the tube; capsule generally shorter than the calyx.

In cultivation, this interesting *Primula* must be grown in the shade and protected from rain. In its native habitats the root-stock is covered with the withered leaves of former years still adhering and imbricated over it like roof tiles.

19. *P. TYROLENSIS*, Schott.—South Tyrol and Venetia—on limestone rocks and stony turf. Leaves somewhat fleshy, viscid, dark green, with little scent, small, roundish or oblong, almost entire or denticulate, teeth with cartilaginous tips. Green parts of the plant densely beset with short glandular hairs; glands colourless. Flower stem four-tenths to two cm. long, one to two flowered; peduncles almost none. Involucral bracts lanceolate or linear, reaching generally half-way up the calyx or to its top. Calyx teeth leaning on the tube of the corolla. Flowers rosy lilac, throat whitish and covered with longish glandular hairs. Anthers of the short-styled flowers inserted a little below, or one-fourth of the tube below, the throat. Capsule reaching a little above the middle of the calyx.—Syn. *P. Allionii*, Koch.

Differs from *P. Allionii*, Schott, in the cartilaginous tips of the leaf-teeth, in the short peduncles, in the long

narrow involucre, in the calyx teeth broadening towards the top, in the shorter and less thick clothing of hair, in the more deeply-cut corolla lobes, in the capsule shorter in proportion to the calyx, and in the smooth, not papillose, epidermis of the seeds. When the plant grows on rocks, the root stock is covered with withered leaves, as in *P. Allionii*.

*E. CYANOPIS*, Schott.—This group contains one species.

20. *P. GLUTINOSA*, Wulf.—Found in Lower Engadine, N. and S. Tyrol, Carinthia, Styria, Carniola, Salzburg, N.-E. Italy—on schist. Leaves somewhat fleshy, glutinous, hardly shining, with something of a cartilaginous margin towards the apex, punctate on the surface, lanceolate-cuneate or oblong-lanceolate, with obtuse or rounded apex, margin rarely entire, generally denticulate, with seven to nine teeth. Involucral bracts oval, rounded at the apex, equal to or overtopping the calyx. Calyx brownish red, teeth oval, obtuse, adpressed to the corolla tube. Flowers very fragrant, at first dark blue, later violet, very seldom white, with a dark ring above the throat. Anthers of the short-styled flowers inserted in, or beneath, the throat. Capsule a little shorter than the calyx.

I have never seen a more beautiful sight than a large bed of this *Primula* on the Muttenjoch, in the Gschnitzthal, in full flower, and exquisitely fragrant in the fresh breeze blowing over the summit of the Pass.

*F. CHAMÆCALLIS*, Schott.—This group also contains only one species, *P. MINIMA*, with its hybrids. Its characters are—Leaves fleshy-coriaceous, smooth, glabrous, with the exception of the capitate hairs, more rarely sub-hirsute or sub-villous, with somewhat cartilaginous points, and with hardly any distinct cartilaginous border. Involucral bracts elongated, narrow. Flowers sessile, rosy or white. Calyx somewhat long. Lobes of corolla bifid or deeply emarginate, obcordate, hairy towards the villous throat, which is destitute of folds. Outer covering of seeds plane.

21. *P. MINIMA*, L.—Found on the Eastern Alps and mountains of eastern Europe. Not in Switzerland. On schist, granite.

Leaves stiffish, shining, without cartilaginous border, cuneate or obtriangular, apex truncate, more rarely arcuate, furnished with three to nine acuminate-mucronate teeth, glabrous, the margin of the leaves and the superior green parts of the plant sprinkled with minute glandular hairs. Flower-stalk short, rarely as long as the leaves, one to two flowered. Peduncles almost none, or as long as 3 mm. Involucral bracts lanceolate, generally a little shorter than the calyx, the apex acuminate or somewhat mucronate. Calyx green, 6 to 9 mm. long, with mucronate teeth. Flowers rosy; throat and interior of corolla-tube glandular-villous, white. Limb of the corolla broad, plane behind, clearly distinct from the tube; its radius 7–16 mm. long. Lobes of the corolla obovate, bifid, cut from two-fifths to half its length. Anthers of the short-styled flowers generally set on the middle of the tube. Capsule hardly reaching half way up the calyx.

Widmer's description is here given in full, as this *Primula* is often difficult to distinguish from some of its hybrids. With regard to the teeth at the apex of the leaves, he remarks that, after a careful examination of a great number of plants from different districts, the following four groups can be made out:—

In No. 1 all the teeth are of the same size and height.

In No. 2 the two, three, or four middle teeth are equal in size and height, while those at the sides are not so high, and are often also smaller.

In No. 3 all the teeth are pretty much of one size, but are set on an arched line, so that the middle one is somewhat higher than the others.

In No. 4 all the teeth form an arched line, the middle one is the largest and highest, while the rest decrease in size on both sides of it, so that the outermost ones may be much smaller than the central one.

22. *P. DEORUM*, Vel.—On Mount Rilo, in Bulgaria, in moist, grassy spots beneath the snowfields, at an elevation of 8000 feet. On syenite.

Leaves slightly fleshy, rather coriaceous, stiff, with a distinct cartilaginous border, punctate on the upper side (the points, not translucent, dark in reflected light, being little shallow pits); oblong or lanceolate, with acute apex;

very entire, with extremely small, almost stalkless, glands set on the pits of the upper surface. Flower stem, bracts, and calyx remarkably black and viscid. Flower stem three or four times longer than the leaves, with five to ten flowers. Peduncles 2 to 5 mm. long. Involucral bracts oblong-linear, often reaching the top of the calyx. Calyx 3 to 4 mm. long, cut to the middle; the teeth narrowly triangular, acuminate. Flowers secund, nodding, red violet; throat and interior of corolla tube of the same colour. Tube passing gradually into the infundibuliform corolla. Radius of corolla 6 to 7 mm. long. Divisions of corolla cut to one-fifth of their length. Anthers of short-styled flowers set a quarter of the length of the tube beneath the throat. Capsule (immature) included in the calyx.

Discovered by Velenovský in 1889. The above is mainly his description. Widmer says: "*P. deorum* resembles in the colour of its flowers, and in habit, a diminutive, small-leaved *P. latifolia* (*P. viscosa*, All.). It is certainly a beautiful *Primula*, but I would much rather give the name *Primula* of the Gods to one of the Alpine species with numerous large bright flowers, as *P. pedemontana*, from Mount Cenis; *P. viscosa* (*P. hirsuta*, All.), from Faïdo and Aosta; *P. calycina*, from Corni di Canzo; *P. spectabilis*, from the Ledrothal." But Widmer had never seen the living plant.

II. Section **Farinosæ**.—Leaves revolute, petioled or sessile, often narrowed into a winged petiole, membranaceous, with or without farina, toothed or quite entire; flowers of middling size or smaller, oftenest blue, or rosy or white, very rarely yellow; bracts more or less lanceolate or subulate, gibbous at the base, or distended towards the base; capsule cylindrical.

23. *P. SIBIRICA*, Jacq.—Occurs in Finland and the north of Sweden and Norway. Leaves roundish or oval, suddenly contracted into the petiole; involucral bracts oval or oblong, acute or shortly acuminate, very gibbous at the base; farina none; calyx cylindrical; flowers somewhat large, less numerous than in the next species, pale lilac; segments of corolla cut to one-third or one-half their length.

The only well-marked variety is *P. EGALLICENSIS*, Wormsk. and Lehm., found in Greenland and Labrador, which, however, Pax regards as a distinct species.

24. *P. FARINOSA*, L.—Found all over Europe, except in the most southerly parts. Small, commonly 10 to 20 cm. high, rarely taller; leaves obovate-oblong or oblong, gradually narrowed into the petiole, white-farinaceous beneath, denticulate or nearly entire; scape much longer than the leaves; flowers shortly pedicellate, flesh-coloured then lilac, more rarely purple or white; calyx teeth sub-obtuse, triangular; corolla tube much longer than the calyx.

*P. Warei*, Stein, differs somewhat from the type in its leaves, which are regularly crenulate-denticulate, and in its dark violet flowers.

Var. *lepida*, Duby, differs from the type only in being destitute of farina. It appears not to have been found in recent times on the north side of the chain of Alps.

Var. *exigua*, Velen., has its seeds pale instead of dark brown, as in *P. farinosa*. The leaves in the young state are on the under side sometimes quite covered with thinly spread farina, which, however, disappears more or less later; sometimes it is altogether destitute of farina. Calyx teeth acuminate. The plant is barely 12 cm. high.—From Bulgaria.

25. *P. SCOTICA*, Hook.—In north of Scotland and in Orkney. The distinguishing marks of this species, as compared with *P. farinosa*, are broad, rounded calyx teeth; broad elliptical leaves, equally and finely cut on the margin; a short scape; and dark violet flowers. Pax regards this as a true species, but he holds *P. Scotica*, Blytt, the Scandinavian plant, to be a form of *farinosa*.

Widmer remarks that the broad, rounded calyx teeth are not found in all the Scottish specimens, and further that they occur in occasional specimens of *farinosa* from widely different localities. As to the colour of the flowers, he regards the dark violet colour as only a dark red, just as the dark violet of *P. Warei*, Stein, is really in the living plant a beautiful, intense red. Accordingly he does not separate *Scotica* from *farinosa*.

26. *P. STRICTA*, Hornem.—In northern Scandinavia,

northern Russia, and Finland. Green parts of the plant not farinose, with the exception of the inner surface of the calyx. Calyx more or less ventricose. Flowers small, less numerous than in *farinosa*. Lobes of the corolla slightly emarginate.

Pax, with some hesitation, regards this as a species. Widmer thinks it is not specifically distinguished from *P. farinosa*.

27. *P. LONGIFLORA*, All. — Switzerland, north Italy, north and south Tyrol, Styria, Carinthia, Carniola, Hungary, Bosnia, and Montenegro. Leaves obovate-oblong or oblong, gradually narrowed into the petiole. Farina abundant on the lower side of the leaves, on the upper part of the scape, and lower part of the calyx. Calyx cylindrical, teeth lanceolate. Flowers less numerous than in *P. farinosa*, paler or darker red-violet, throat yellow; corolla tube of a dirty red, or, especially in the upper part, yellowish, 20 mm. long or longer, seldom only 16 mm. long, two to three and a half times as long as the calyx. Homostyle plants, the anthers of all the flowers being set in the throat of the corolla; stigma protruding.

This species appears to be very constant, and subject to very little variation. Very rarely the leaves are without powder on the under side.

28. *P. FRONDOSA*, Janka. — Found in the north of Thrace. Leaves thin, oval or lanceolate-linear, generally furnished with copious farina beneath. Involucral bracts linear-lanceolate, not gibbous at the base. Calyx ovate-cylindrical. Flowers of the same size as in *P. farinosa*.

III. Section **Vernales**. — To this section, identical with the sub-genus *Primulastrum* of Duby, belong the remaining European Primulas.

Leaves revolute when young, membraceous, rugose, more or less pubescent, without farina, undivided, serrulate or denticulate or crenulate. Flowers yellow or purplish, umbellate; scape elongate or almost wanting. Involucral bracts narrow, not gibbous. Calyx tubular or campanulate, with sharp angles and acute segments. Capsule cylindrical, exserted or included in the calyx. Stomata of the upper

surface of the leaves few, those of the under surface numerous.

Found over the whole of Europe, with the exception of the sub-arctic region, from the sea-level to an elevation of 6500 feet. They occur also in the district of the Eastern Mediterranean. *Primula acaulis* is found in Algeria, and *P. elatior* and *P. officinalis* in Siberia.

29. PRIMULA ACAULIS, L.—Flower scape wanting. Peduncles long, arising from the root-stock. Leaves more or less hairy beneath. Corolla flat, large, pale sulphur colour. Capsule oval, two-thirds as long as the calyx. *P. vulgaris*, Huds.—Occurs throughout almost the whole of Europe.

Var. *caulescens*, Auct., differs from the type in having a developed flower scape, and is found rarely with the ordinary form.

Var. *balearica*, Willkomm.—Leaves on the underside almost glabrous. Flowers white. Balearic Islands.

Var. *Sibthorpii*, Reichenb.—Leaves more or less hairy beneath. Scape almost wanting. Flowers rosy. Eastern Mediterranean region.

30. P. ELATIOR, L.—Flowers umbellate on a scape. Leaves more or less pubescent beneath, or glabrous. Corolla tolerably large, sulphur-coloured, nearly flat. Capsule cylindrical, a little longer than the calyx. Leaves oval or obovate, much wrinkled, generally contracted suddenly into the more or less winged petiole. Calyx with acute triangular teeth; angles green.

Almost everywhere in Europe, from the sea-level to an altitude of nearly seven thousand feet (in Bavaria and the Tyrol).

Var. *intricata*, Gr. Godr.—Leaves obovate-elliptical or oval, gradually attenuated into the broadly-winged petiole, less wrinkled. Scape a little longer than, or shorter than, the leaves. Calyx narrowly tubular-campanulate, with triangular, acute segments. Capsule shortly cylindrical, equalling the calyx, or more rarely a little longer.

Pyrenees, Alps, Bosnia.

31. P. OFFICINALIS, L.—Flowers umbellate, two to forty on the scape. Leaves ovate or ovate-oblong, generally contracted suddenly into the winged petiole;

velvety and grey-green beneath. Calyx campanulate, inflated, whitish yellow; teeth broadly ovate or triangular, shortly acuminate. Corolla small, concave, egg yellow, less commonly sulphur yellow. Capsule oval, only half as long as the calyx.

Almost everywhere throughout Europe, reaching to an altitude of 4000 feet.

Var. *Pannonica*, Kerner.—Leaves oval or oblong, generally contracted gradually into the winged petiole, underneath hoary-tomentose. Calyx widely campanulate. This is var. *inflata*, Pax.

Hungary, Lower Austria, Maritime Alps, Pyrenees, etc.

Var. (sub. sp. ?) *Columnæ* (Ten.) Pax.—Leaves ovate or cordate, suddenly narrowed into the narrowly winged petiole, underneath snowy-tomentose, thickly felted. Corolla, as in var. *Pannonica*, somewhat flatter than in the type.

Found over the whole Mediterranean region.

Var. *Tommasinii*, Gr. Godr.—Corolla sulphur yellow (as in *P. elatior*), with five orange spots, almost flat, otherwise like *P. Columnæ*.—Mte. Maggiore, near Fiume, and Pic de l'Hiéris in the Pyrenees.

The four forms, *officinalis*, *Pannonica*, *Columnæ*, and *Tommasinii*, pass imperceptibly into one another, so that many plants may be equally well referred to one or to another of them. Kerner regards the most distinct difference to lie in the form and size of the corolla; he unites *Columnæ* with *Tommasinii*. These two can be distinguished only by the flowers, which in the former are bell-shaped and egg yellow, as in *P. officinalis*, while in the latter they are flat, or almost flat, and sulphur-coloured, as in *P. elatior*.

*Note*.—In compiling this account of the European Primulæ, I am specially indebted to two works which I have used freely, viz. "Monographische Uebersicht über die Arten der Gattung Primula," von Dr. Ferdinand Pax, Leipzig, 1888, and "Die europäischen Arten der Gattung Primula," von E. Widmer, München, 1891.